CLAIMS:

1.   A method of calibrating an imaging device comprising:

characterizing the imaging device with a device model such that an average error

5   between expected outputs determined from the device model and measured outputs of the

imaging device is on the order of an expected error; and

adjusting image rendering on the imaging device to achieve a target behavior.

2.   The method of claim 1, wherein measured outputs define a subset of device

10   values substantially corresponding to neutral colors.

3.   The method of claim 2, wherein the imaging device comprises a cathode ray tube,

and wherein neutral colors have substantially equivalent red, green and blue device

values.

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4.   The method of claim 1, wherein adjusting image rendering comprises adjusting

image data applied to the imaging device.

5.   The method of claim 4, wherein adjusting image data further includes creating

20   entries for a lookup table (LUT) based on the device model.

6.   The method of claim 4, wherein adjusting image data further includes creating a

color profile for the imaging device based on the device model.

25   7.   The method of claim 1, wherein the device model has one or more adjustable

parameters, the method further comprising characterizing the imaging device with the

device model by choosing values for the adjustable parameters of the device model.

8.   The method of claim 7, wherein a number of the adjustable parameters is less than

30   a number of measured outputs of the imaging device.

9.   The method of claim 7, wherein the imaging device is a cathode ray tube and the adjustable parameters comprise a gamma value and a black onset value.

10.   The method of claim 1, wherein the imaging device is a cathode ray tube and the

5   target behavior corresponds to a defined gamma value.

11.   A method of calibrating an imaging device comprising:

characterizing the imaging device with a device model having a set of adjustable parameters;

10   measuring color output from the imaging device; and

reducing error between the measured color output and expected color output as defined by the device model by adjusting the adjustable parameters of the device model.

12.   The method of claim 1, wherein the imaging device is a cathode ray tube and the

15   adjustable parameters include a gamma value and a black onset value.

13.   A method of calibrating a cathode ray tube comprising:

measuring outputs of the cathode ray tube for a subset of device values of the cathode ray tube;

20   choosing one or more adjustable parameter values of a device model for the cathode ray tube such that an average error between expected outputs determined from the device model and measured outputs of the cathode ray tube is on the order of an expected error, wherein a number of the adjustable parameters is less than a number of measured outputs of the imaging device; and

25   adjusting image data according to the device model to achieve a target behavior for the cathode ray tube.

14.   The method of claim 13, wherein the subset of device values substantially correspond to neutral colors having values of red, green and blue on the order of one

30   another.

15.   The method of claim 13, wherein adjusting image data further includes creating a lookup table (LUT) based on the device model.

16.   The method of claim 13, wherein adjusting image data further includes creating a color profile for the imaging device based on the device model.

17.   The method of claim 13, wherein the parameters comprise a gamma value and a black onset value.

18.   The method of claim 13, wherein the target behavior corresponds to a defined gamma value.

19.   A method of calibrating a cathode ray tube comprising:

initializing a lookup table (LUT);

adjusting settings of the cathode ray tube to substantially achieve a defined output;

measuring output for a number of color values;

choosing adjustable parameter values for a device model, wherein a number of adjustable parameters is less than a number of measured outputs; and

generating entries for the LUT based on the device model.

20.   The method of claim 19, wherein adjustable parameters of the device model include a gamma value and an onset value.

21.   The method of claim 19, wherein measuring output includes displaying a substantially white trace during measurement to bias an output measurement.

22.   The method of claim 21, wherein the trace has a halo shape.

23.   The method of claim 19, wherein the LUT resides in a video card.

24.   A method comprising:

measuring output of a display device; and

displaying a substantially white trace during measurement to bias an output

measurement.

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25.   The method of claim 24, wherein the trace has a halo shape.

26.   The method of claim 24, further comprising displaying the substantially white

trace during measurement to bias output measurements by approximately 0.5 to 1.0

10   percent.

27.   The method of claim 24, further comprising displaying the substantially white

trace during measurement to bias an output measurement by an amount sufficient to

ensure that the output measurement is within a dynamic range of a measurement device.

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28.   A cathode ray tube calibrated such that:

an average color error is approximately less than (0.75 delta e) from an analytical

expected color output; and

a maximum color error is approximately less than (1.5 delta e) from the analytical

20   expected color output.

29.   The cathode ray tube of claim 28, wherein:

the average color error is approximately between (0.3 delta e) and (0.75 delta e)

from the analytical expected color output; and

25   the maximum color error is approximately between (0.6 delta e) and (1.1 delta e)

from the analytical expected color output.

30.   The cathode ray tube of claim 29, wherein

the average color error is approximately between (0.3 delta e) and (0.4 delta e)

30   from the analytical expected color output; and

the maximum color error is approximately between (0.6 delta e) and (0.8 delta e) from the analytical expected color output.

31.   A set of cathode ray tubes, wherein each cathode ray tube in the set is calibrated
5   such that:

an average color error is approximately less than (0.75 delta e) from an analytical expected color output; and

a maximum color error is approximately less than (1.5 delta e) from the analytical expected output.

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32.   The set of cathode ray tubes of claim 31, wherein each cathode ray tube in the set is calibrated such that:

the average color error is approximately between (0.3 delta e) and (0.75 delta e) from the analytical expected color output; and

15   the maximum color error is approximately between (0.6 delta e) and (1.1 delta e) from the analytical expected color output.

33.   The set of cathode ray tubes of claim 32, wherein each cathode ray tube in the set is calibrated such that:

20   the average color error is approximately between (0.3 delta e) and (0.4 delta e) from the analytical expected color output; and

the maximum color error is approximately between (0.6 delta e) and (0.8 delta e) from the analytical expected color output.

25   34.   A computer readable medium storing program code that when executed calibrates an imaging device by:

characterizing the imaging device with a device model such that an average error between expected outputs determined from the device model and measured outputs of the imaging device is on the order of an expected error; and

30   adjusting image rendering on the imaging device to achieve a target behavior.

35. The computer readable medium of claim 34, wherein measured outputs define a subset of device values substantially corresponding to neutral colors.

36. The computer readable medium of claim 35, wherein the imaging device comprises a cathode ray tube, and wherein neutral colors have substantially equivalent red, green and blue device values.

37. The computer readable medium of claim 34, wherein adjusting image rendering comprises adjusting image data applied to the imaging device.

38. The computer readable medium of claim 37, wherein adjusting image data further includes creating entries for a lookup table (LUT) based on the device model.

39. The computer readable medium of claim 37, wherein adjusting image data further includes creating a color profile for the imaging device based on the device model.

40. The computer readable medium of claim 34, wherein the device model has one or more adjustable parameters, the method further comprising characterizing the imaging device with the device model by choosing values for the adjustable parameters of the device model.

41. The computer readable medium of claim 40, wherein a number of the adjustable parameters is less than a number of measured outputs of the imaging device.

42. The computer readable medium of claim 40, wherein the imaging device is a cathode ray tube and the adjustable parameters comprise a gamma value and a black onset value.

43. The computer readable medium of claim 34, wherein the imaging device is a cathode ray tube and the target behavior corresponds to a defined gamma value.

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44.   A computer readable medium storing program code that when executed calibrates an imaging device by:

characterizing the imaging device with a device model having a set of adjustable parameters;

5   measuring color output from the imaging device; and

reducing error between the measured color output and expected color output as defined by the device model by adjusting the adjustable parameters of the device model.

45.   The computer readable medium of claim 44, wherein the imaging device is a

10   cathode ray tube and the adjustable parameters include a gamma value and a black onset value.

46.   A computer readable medium storing program code that when executed calibrates a cathode ray tube by:

15   measuring outputs of the cathode ray tube for a subset of device values of the cathode ray tube;

choosing one or more adjustable parameter values of a device model for the cathode ray tube such that an average error between expected outputs determined from the device model and measured outputs of the cathode ray tube is on the order of an

20   expected error, wherein a number of the adjustable parameters is less than a number of measured outputs of the imaging device; and

adjusting image data according to the device model to achieve a target behavior for the cathode ray tube.

25   47.   The computer readable medium of claim 46, wherein the subset of device values substantially correspond to neutral colors having values of red, green and blue on the order of one another.

48.   The computer readable medium of claim 46, wherein adjusting image data further

30   includes creating a lookup table (LUT) based on the device model.

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49.   The computer readable medium of claim 46, wherein adjusting image data further includes creating a color profile for the imaging device based on the device model.

50.   The computer readable medium of claim 46, wherein the parameters comprise a
5   gamma value and a black onset value.

51.   The computer readable medium of claim 46, wherein the target behavior corresponds to a defined gamma value.

10   52.   A computer readable medium storing program code that when executed calibrates a cathode ray tube by:

        initializing a lookup table (LUT);

        adjusting settings of the cathode ray tube to substantially achieve a defined output;

15   measuring output for a number of color values;

        choosing adjustable parameter values for a device model, wherein a number of adjustable parameters is less than a number of measured outputs; and

        generating entries for the LUT based on the device model.

20   53.   The computer readable medium of claim 52, wherein adjustable parameters of the device model include a gamma value and an onset value.

54.   The computer readable medium of claim 52, wherein measuring output includes displaying a substantially white trace during measurement to bias an output measurement.
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55.   The computer readable medium of claim 54, wherein the trace has a halo shape.

56.   The computer readable medium of claim 52, wherein the LUT resides in a video card.
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57.   A computer readable medium storing program code that when executed:

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measures output of a display device; and

displays a substantially white trace during measurement to bias an output

measurement.

5   58.   The computer readable medium of claim 57, wherein the trace has a halo shape.

59.   The computer readable medium of claim 57, wherein the program code when

executed displays the substantially white trace during measurement to bias output

measurements by approximately 0.5 to 1.0 percent.

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60.   The computer readable medium of claim 57, wherein the program code when

executed displays the substantially white trace during measurement to bias an output

measurement by an amount sufficient to ensure that the output measurement is within a

dynamic range of a measurement device.

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